I propose to employ this arrangement for the measurement of the rate of diffusion, but for particulars I must refer to my forthcoming paper.

Wollaston's experiment with the red-hot poker was probably, his experiment with the long red-hot bar of iron almost certainly, similar to that above described with the long tank and the weak brine; and *not* to that with the short tank, though the latter is usually cited as Wollaston's contribution to the explanation of the Vince phenomenon. We have seen how essentially different they are, and that the latter does not correspond to the conditions presented in nature. P. G. TAIT

NOTES

THE Council of the Scottish Meteorological Society are soliciting subscriptions, however small, for the proposed Ben Nevis Observatory. It is essential to the success of this important national undertaking that the buildings should be erected during the present summer, and several thousand pounds are required before operations can be commenced. A considerable sum has already been received in liberal subscriptions from a few individuals, but not nearly enough for the purpose. We trust that many of our readers will send what they can to the Scottish Meteorological Society, Edinburgh.

DR. WILD, president of the International Circumpolar observation parties, announces that in conformity with the request of several Governments, the observations now going on round the Pole will not be prolonged beyond the time originally fixed, viz. September, and that all the parties, if not prevented by ice, will be back within that month.

A LETTER read at the Paris Geographical Society states that P. Vidal, French missionary to Samoa, has discovered the remains of La Perouse and his unfortunate companions.

THE Rev. S. J. Perry, S.J., has lately been elected a Corresponding Member of the Accademia dei Lincei.

DR. HENRY SCHLIEMANN has been elected an Honorary Fellow of Queen's College, Oxford.

LAST week we announced that a baronetcy had deservedly been conferred on Dr. William Chambers, and this week we regret to announce the death of the veteran publisher in his eighty-fourth year. As the head of the firm of Messrs. W. and R. Chambers, he has through a long life done splendid service in the spread of education, and of a knowledge of science. In his "Information for the People," his "Tracts," his text-books of science, among the first of their kind, and by various other means, he did good pioneer work in scientific literature and education.

IN reference to our note last week (p. 63), a correspondent writes that the American table at Naples is being used by its first occupant, Dr. E. B. Wilson, of the Johns Hopkins University, Baltimore. Dr. Wilson has been working during a part of the year at Cambridge on early mammalian embryology, and at Naples his work will probably be either on certain points in the development of some of the Cœlenterata or upon the embryology of the Dicegemidæ as available material permits. Williams College, Mass., which holds the American table, receives a brief course of lectures from each worker whom it appoints to the privileges of the Naples Station.

ON the evening of Friday last week several tornadoes swept over the states of Minnesota, Wisconsin, Illinois, and Missouri, which were exceptionally destructive to life and property even for that tornado-troubled region. It is reported that 83 persons have been killed and 340 injured, many of them fatally, and a very large number of houses reduced to ruins. Of these tornadoes the most terrible in its destructiveness would appear to have been the one which passed over Racine in the south-east of Wisconsin, killing 25 and injuring 100 persons, and wrecking 150 buildings. The path of the tornado was about 400 yards wide and half a mile long, and all buildings, particularly those in the central line of its path, collapsed into mere masses of ruins. Waggons and other movable articles were blown into Lake Michigan, over which the tornado passed on leaving the town, the whirling columns of clouds and the violent commotions of the lake presenting a grand and impressive spectacle. The recently published "Professional Papers of the Signal Service, No. VII." show that the region over which these tornadoes passed is comprehended within that portion of the United States where tornadoes are of most frequent occurrence.

MR. BRUNLEES, the President of the Institution of Civil Engineers, has sent out invitations for a *conversazione* at the South Kensington Museum on Wednesday, the 30th inst.

ON Saturday last, May 19, the Essex Field Club held its first meeting of the session. The party, nearly ninety in number, alighted at Theydon Bois Station on the Ongar branch of the Great Eastern Railway, and proceeded through Epping Forest to Ambresbury Banks, where they were met by Sir T. Fowell Buxton. The party was then conducted through the splendid park belonging to the Copt Hall Estate, and finally assembled at Warlies, Waltham Abbey, the seat of Sir Fowell Buxton, who had kindly invited the Club for the occasion. In the course of the evening a paper on "English Plant Names" was read by Mr. J. Britten, F.L.S.

THE Paris Aëronautical Exhibition will be opened at the Trocadéro on June 5 and close on the 18th. MM. Janssen, Berthelot, Paul Bert, and Hervi Mangon are among the members of the committee, as well as a number of senators and deputies. The festival will take place at Annonay on July 29, and statues of the two brothers Montgolfier will be erected on the public place of the city. A competition has been opened in Paris, and the works of competitors are on view at the Cercle de la Librairie. The jurymen, mostly members of the Academy of Beaux Arts, will give their award on Saturday next. The height of the monument and pedestal will be 7 metres. The prize is 3000 francs for the plaster model to be exhibited at Annonay on July 29, and 40,000 francs for the bronze. The marble for the pedestal will be given by Government. A public banquet will be given in Paris, M. Gaston Tissandier being in the chair.

ON April 29, at 10.30 p.m., a brilliant meteor was observed in Jondalen in Norway. It appeared in the east, and went in a southerly direction, where it passed out of sight. Its size to the eye was about the same as the moon's, while its shape appeared to be conic. The colour of its track was deep red, and it shone so brilliantly that the smallest objects could be seen on the ground. It lasted several seconds, and disappeared behind some mountains.

ON the 13th, at 8 o'clock in the evening, a large meteor was observed at Epinal, travelling from south-east to north-west; it had a disk which has been estimated at a decimeter. The tail was of a pinky colour; a noise from explosion was heard. It was also observed at Mulhausen.

THE Reports on the Public Gardens and Plantations in Jamaica are becoming yearly of more importance. That for the year ending September 30 last is now before us. Mr. Morris opens his report by bearing testimony to the liberality of the Steamship and Railway Companies in conveying plants free of charge to the different ports and railway stations. "By these means," it is stated, "districts, formerly beyond the reach of the Public Gardens, have been able to obtain plants as conveniently and as

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cheaply as if they were in the neighbourhood of Kingston." It is stated that a drought, caused chiefly by the failure of the May rains coming after a succession of dry months with parching winds, had a prejudicial effect on all agricultural operations. Mr. Morris says: "It is a subject of common remark amongst old planters that the 'seasons,' or the periodical rains which have hitherto fallen with great regularity and copiousness during the months of May and October of each year, are becoming more and more uncertain and irregular, and the effects of these conditions are clearly shown in the precariousness of the agricultural products affected by them. These remarks apply chiefly to the southern slopes of the Blue Mountains, and to such other districts stretching south and west where coffee and provisions are being chiefly raised." Under the head of "Cinchona Plantation," the cultivation of which plants has become an object of special attention in Jamaica, Mr. Morris reports very fully. He says: "In order to test the commercial value of Jamaica grown bark, no better plan could be followed than to send it in lots to the open market and place it in competition with barks from other countries. That it has so satisfactorily stood this test and brought in a large return on the outlay, and, moreover, that the results of the sales have induced cinchona planting to be undertaken in the island by private enterprise with energy and success, are matters for which the Government no less than the general public are to be congratulated." "During the past year chief attention has been given to the successful introduction of *Cinchona Ledgeriana* and its establishment as a cultivated plant in Jamaica. In addition to the plants established on the Government plantations, several thousands have been distributed amongst private planters, and each lot of these will doubtless form a nucleus from whence seeds and cuttings may hereafter be obtained, and thus prove most valuable acquisitions to private plantations." A few plants of the now well known cuprea bark, *Remijia pedunculata*, have been raised from seed received from Bogota, and are being tried in order to test the value of the bark under cultivation. An attempt is about to be made to manufacture cinchona febrifuge in the island in a similar way to what is being now done so successfully in the East Indies. By this means a valuable and cheap preparation will be available for use among the poorer classes. Besides the cinchonas the cultivation of jalap and various other economic plants has received attention during the year, so that we have evidence that a good deal of really useful work is being carried on by Mr. Morris in Jamaica.

A WRITER in the *North China Herald* on the history of gunpowder in China asserts that this explosive was known in the seventh century of our era. The alchemists of the Han dynasty, and subsequently in the fourth and following centuries, worked with saltpetre and sulphur, as well as cinnabar, red oxide of lead, and other common compounds. But in the seventh century we find gunpowder used to make a crackling sound and to afford an agreeable sight to the court of Sui Yang-ti, the emperor of that time. The earliest exhibitions of fireworks mentioned in Chinese history belong to that date. The substances used in the composition of gunpowder are all native to China, and the writer appears to prove conclusively that the Arabs derived the art of firework making, as well as gunpowder, from the Chinese. The discovery once made, the Chinese alchemists, owing to the badness of their hypotheses and the futility of their aims, were slow at improvement. But the doctors of the Arab colonies in China carried to Bagdad the germs of the Chinese discoveries, and there they were elaborated into new forms. In short, in many arts and sciences the Arabs learnt from China, and, assisted by Nestorians, Jews, and Greeks, improved on what they learned. In course of years, cannon, matchlocks, and shells for use in sieges were brought to China from Mohammedan countries. There are faint traces in the eleventh century of rude firearms; in the twelfth and thirteenth centuries the records of their use in the Chinese wars become frequent and distinct. The Golden Tartars, in their wars with South China in the twelfth century, used cannon which they called "heaven-shaking thunder." In an iron tube was placed powder which was "set fire to, and would burn down half a square *li* of houses and pierce a coat of mail made of iron rings." It is expressly stated that Genghis Khan, the Mongol conqueror, used cannon in his wars. Kublai Khan also used these weapons at a siege celebrated in Chinese history—that of Siang-yang. Hearing, it is said, the sound of the explosion, which shook the sky, and seeing that the balls entered seven feet into the earth, the Chinese defenders of the city capitulated. It is clear that China owed its knowledge of artillery to the Mohammedans. In the fourteenth century commenced the European intercourse with China, which then abandoned the Arabs, and took the Portuguese as teachers in the construction of weapons of warfare.

NEWS from Iceland states that from the 12th to the 21st of March there were violent volcanic water eruptions.

A REUTER'S telegram from Hong Kong *via* San Francisco announces the completion of the telegraph line between Canton and that colony. This is the second great line in China, and appears to have been constructed wholly by native merchants in Canton, who found the want of early communication with western markets in their commercial transactions. Vigorous preparations are also being made for the most formidable undertaking of this nature that has yet been attempted in China, viz. a line connecting Peking with Canton. According to the latest information an expeditionary party has arrived at Shanghai to conduct the necessary surveys. It will proceed first to Soochow, and there, under the escort of 200 troops, will commence its work, proceeding southward.

A NUMBER of students at the Ecole des Mines of France will during the summer make an excursion to the Arctic regions. A steamer, in charge of a Norwegian Arctic hunter, will bring the party to Throndhjem and Hammerfest, and thence to Spitzbergen, which will be examined during a fortnight's stay. The Naturalistic Museum of Paris sends two *savants* with the party.

THE additions to the Zoological Society's Gardens during the past week include two Green Monkeys (*Cercopithecus callitrichus* ♂ ♀) from West Africa, presented by Mr. Thos. H. Dixon; a Long-eared Owl (*Asio otus*), British, presented by the Rev. H. D. Grantham; a Smooth Snake (*Coronella lævis*), European, presented by Mr. W. H. B. Pain; seven Black and Yellow Cyclodus (*Cyclodus nigro-luteus*) from Tasmania, presented by Baron Ferdinand von Mueller, C.M.Z.S.; a Proteus (*Proteus anguinus*), European, presented by Miss Maud Howard; a Sea Crayfish (*Palinurus vulgaris*), British Seas, presented by Messrs. Milestone and Staniforth; three Green-winged Doves (*Chalcophaps indica*) from India, a Herring Gull (*Larus argentatus*), British, deposited; a King Vulture (*Gypagus papa*) from Tropical America, purchased; a Cabot's Tragopan (*Ceriornis caboti* ♀) from North-West China, received on approval.

OUR ASTRONOMICAL COLUMN

THE COMET OF 1707.—The elements of this comet's orbit, as calculated by Lacaille and Struyck, bear a certain degree of resemblance to those of the comet discovered by De Vico at Rome on February 20, 1846 (1846 IV. of our catalogues), to which Van Deinse's definitive calculation assigns a period of revolution of 73 years. The interval between the perihelion passages in 1707 and 1846 would give two periods of 69·1 years; there is consequently a sufficient reason for examining how far the elements of the comet of 1707 represent the observations. It appears to have been discovered by Manfredi at Bologna on November 25, and the place given in the *Mémoires* of the Paris

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